# Obesity and Functional Foods

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**Baton Rouge, LA**

# The Obesity Epidemic

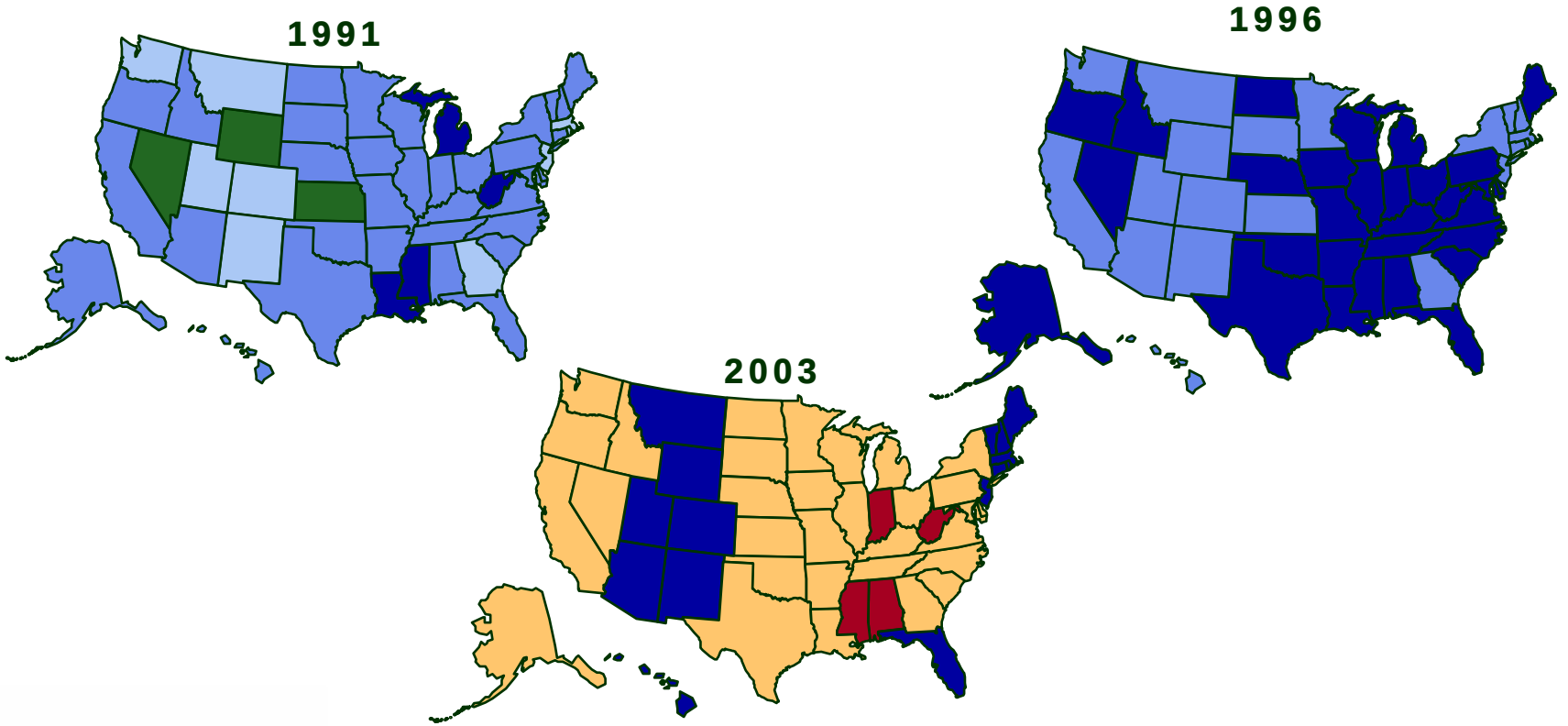
# Obesity Statistics Today

- More than 64% of U.S. adults overweight or obese
  - 120 million adults
- 30% of adults ≥20 yrs of age were obese in 1999-2002 compared with 23% in 1994 (NCHS/CDC)
- Major risk factor for heart disease, diabetes, some cancers

# Obesity Trends* Among U.S. Adults

## BRFSS, 1991, 1996, 2003

**(*BMI ≥30, or about 30 lbs overweight for 5'4" person)**



# The Rising Rate of Childhood Obesity is Alarming


July 2000

# Obesity Statistics - Children

- **22 million of the world's children under 5 are overweight or obese.**
- **Research indicates that in some parts of Africa, fatness and obesity afflicts more children than does malnutrition – sometimes 4x as many.**
- **In 1999 in the US nearly 13% of children were overweight or obese.**

International Obesity Task Force

# Obesity Statistics - Children

- **The obesity task force estimates that in some countries, more than 30% of the children are obese.**
- **In Egypt more than 25% of 4-year-olds are fat.**
- **Obesity rates are also more than 25% among children aged between 4 and 10 in Chile, Peru and Mexico.**

International Obesity Task Force

# Causes of Adolescent Obesity: The Obesogenic Environment

**OBESOGENIC ENVIRONMENT**

**Sports & Leisure**
- Lack of school facilities
- Few local playing areas
- Widely available indoor passive entertainment
- Unsafe streets
- Few cycle routes

**High energy foods promoted via**
- Advertising
- "Super-sizing"
- School-based marketing
- Snacks, soft drinks
- Sponsorship
- Eating out

**Family**
- Genetic predisposition
- Excess weight in parents
- Breast-feeding practices
- Parents' health knowledge, budgeting, shopping, & cooking skills

**Education & Information**
- *Lack of School lessons* – lifestyle, nutrition, cooking
- *Cultural beliefs*

*Source: Adapted from IOTF Obesity in Europe report*

# Childhood Obesity has Serious Medical and Psychosocial Complications

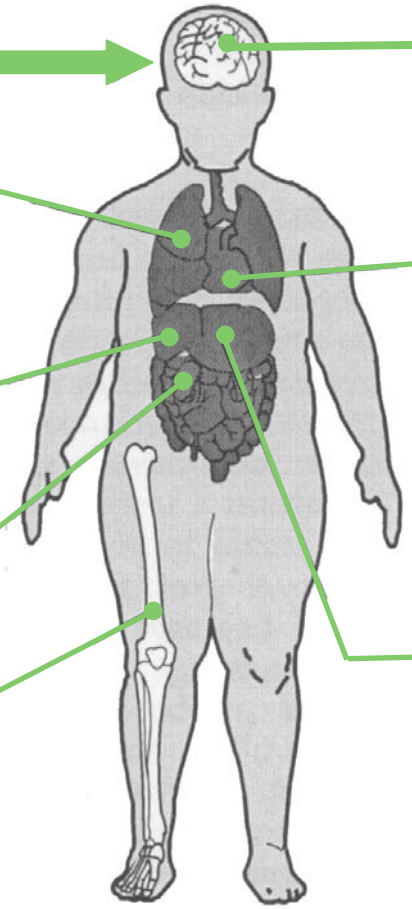
**Psychosocial**
Poor self esteem
Depression
Eating disorders

**Pulmonary**
Sleep apnoea
Asthma
Exercise intolerance

**Gastrointestinal**
Gallstones
Steatohepatitis

**Renal**
Glomerulosclerosis

**Musculoskeletal**
Slipped capital femoral epiphysis
Blount's disease
Flat feet

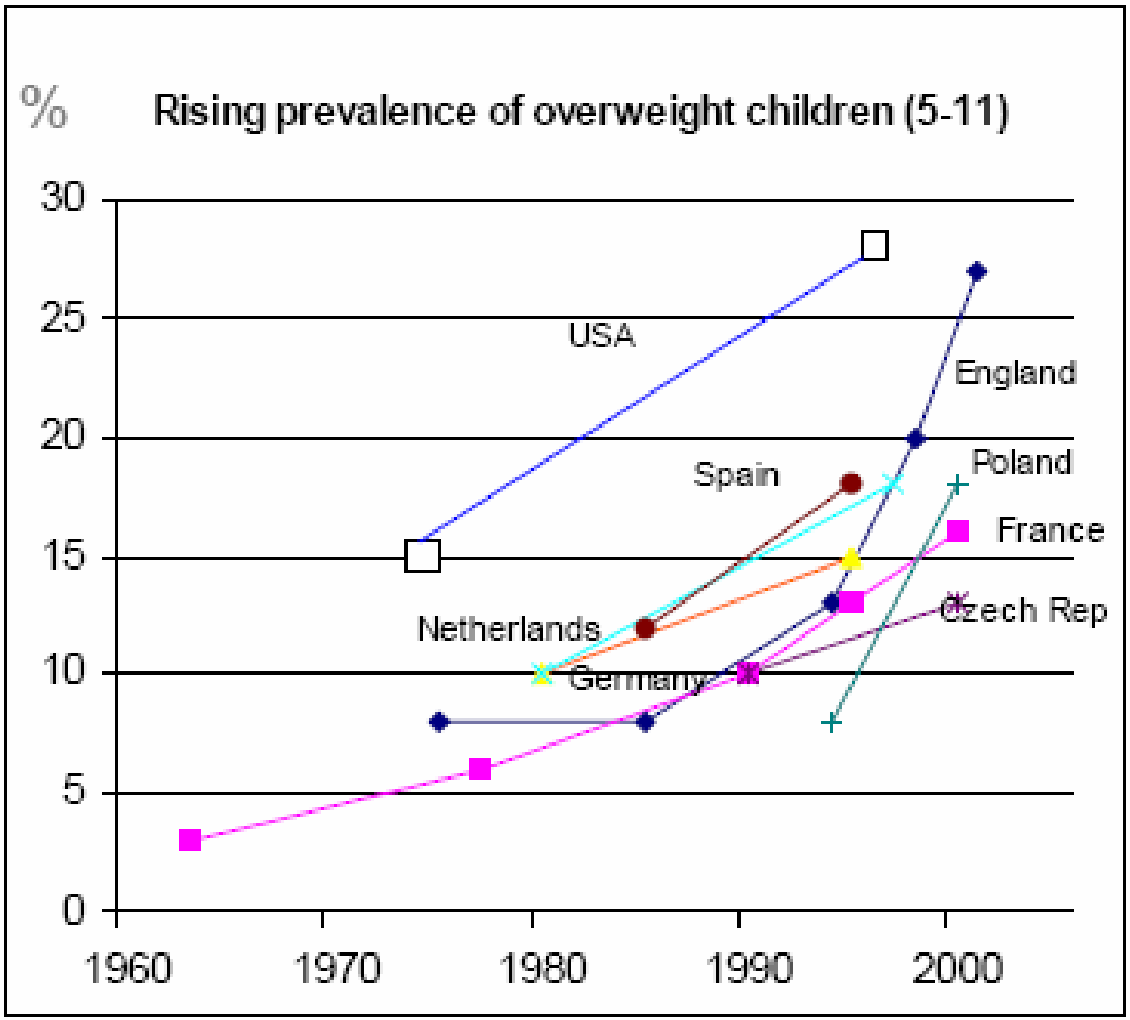


**Neurological**
*Pseudotumor cerebri*

**Cardiovascular**
Dislipidaemia
Hypertension
Coagulopathy
Chronic inflammation
Endothelial dysfunction

**Endocrine**
Type 2 diabetes
Precocious puberty
Polycystic ovary syndrome
Hypogonadism (boys)

*Adapted from Ebbeling et al, Lancet 2002; 360: 473-82*

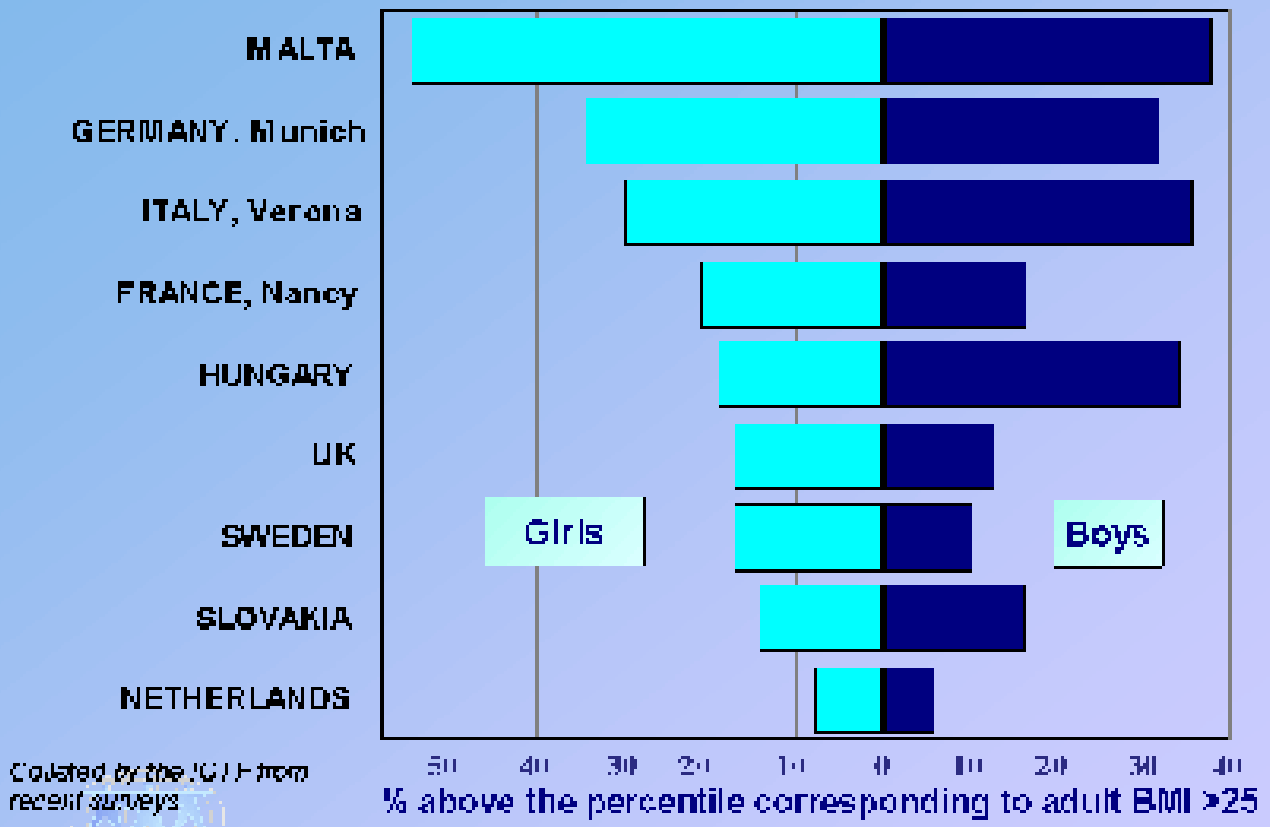

%
Rising prevalence of overweight children (5-11)
30
25
20
15
10
5
0
1960
1970
1980
1990
2000
USA
England
Spain
Poland
France
Netherlands
Germany
Czech Rep

# Prevalence of overweight* children aged 6 to 8 years old

| | USA 1988-91 | China 1993 | Russia 1994-5 | South Africa 1994 | Brazil 1989 |
|---|---|---|---|---|---|
| Girls | 24.2 | 12.2 | 17.8 | 20.3 | 10.5 |
| Boys | 21.3 | 14.1 | 25.6 | 25.0 | 12.8 |

**Popkin et al 1996**
**(*defined as BMI higher than the US reference NHES 85th percentile)**

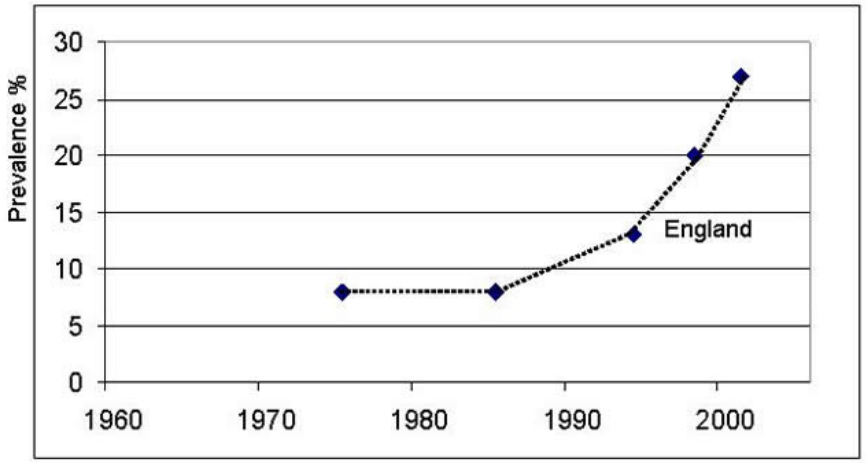
## Overweight and obese 10-year olds in selected European countries



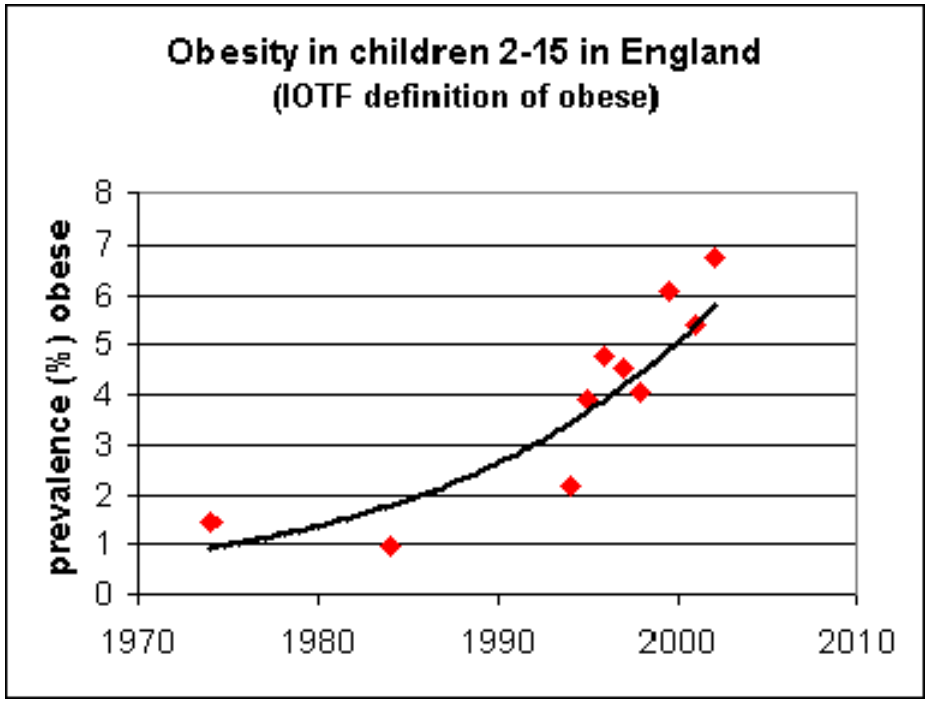

Collated by the IOTF from recent surveys

## Overweight children

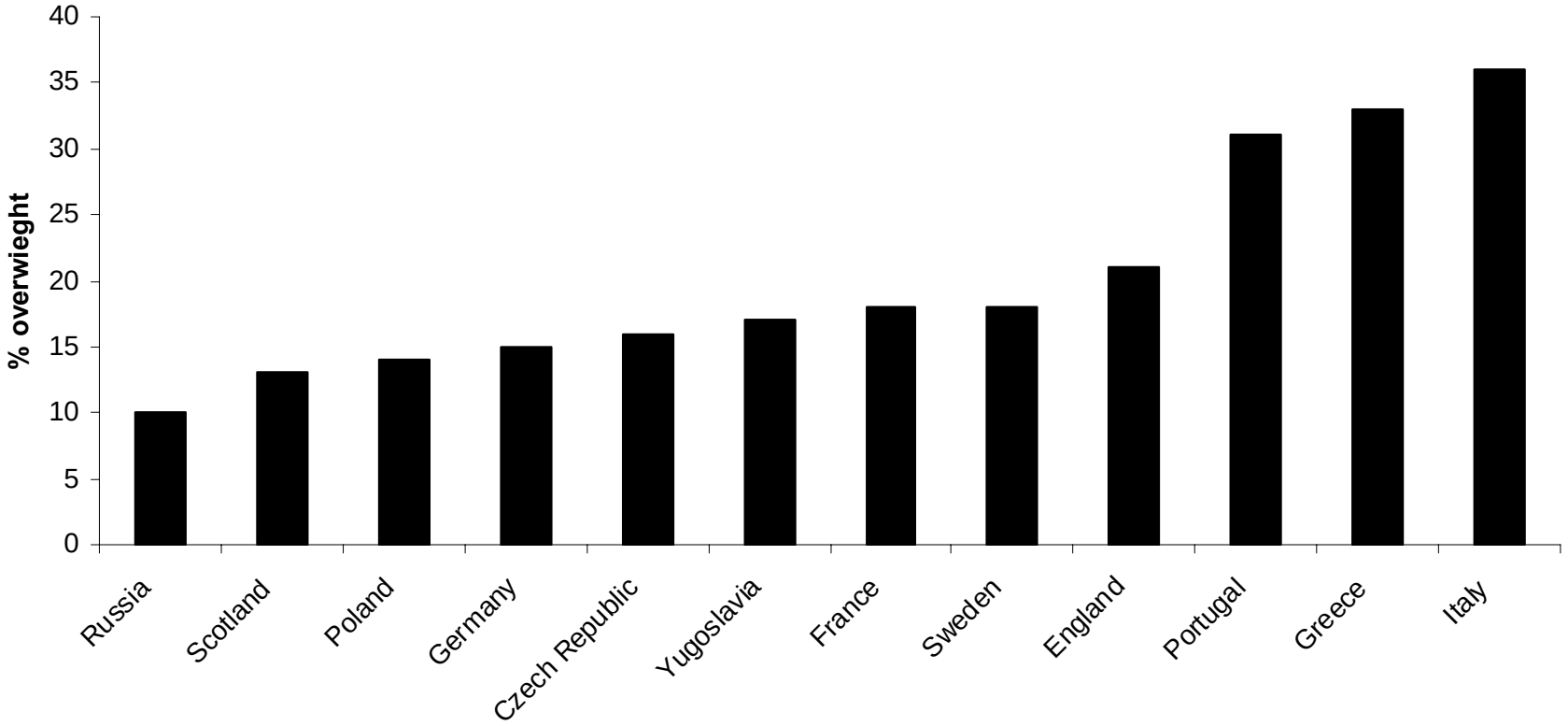
## Trends in the last three decades




IOTF 2004



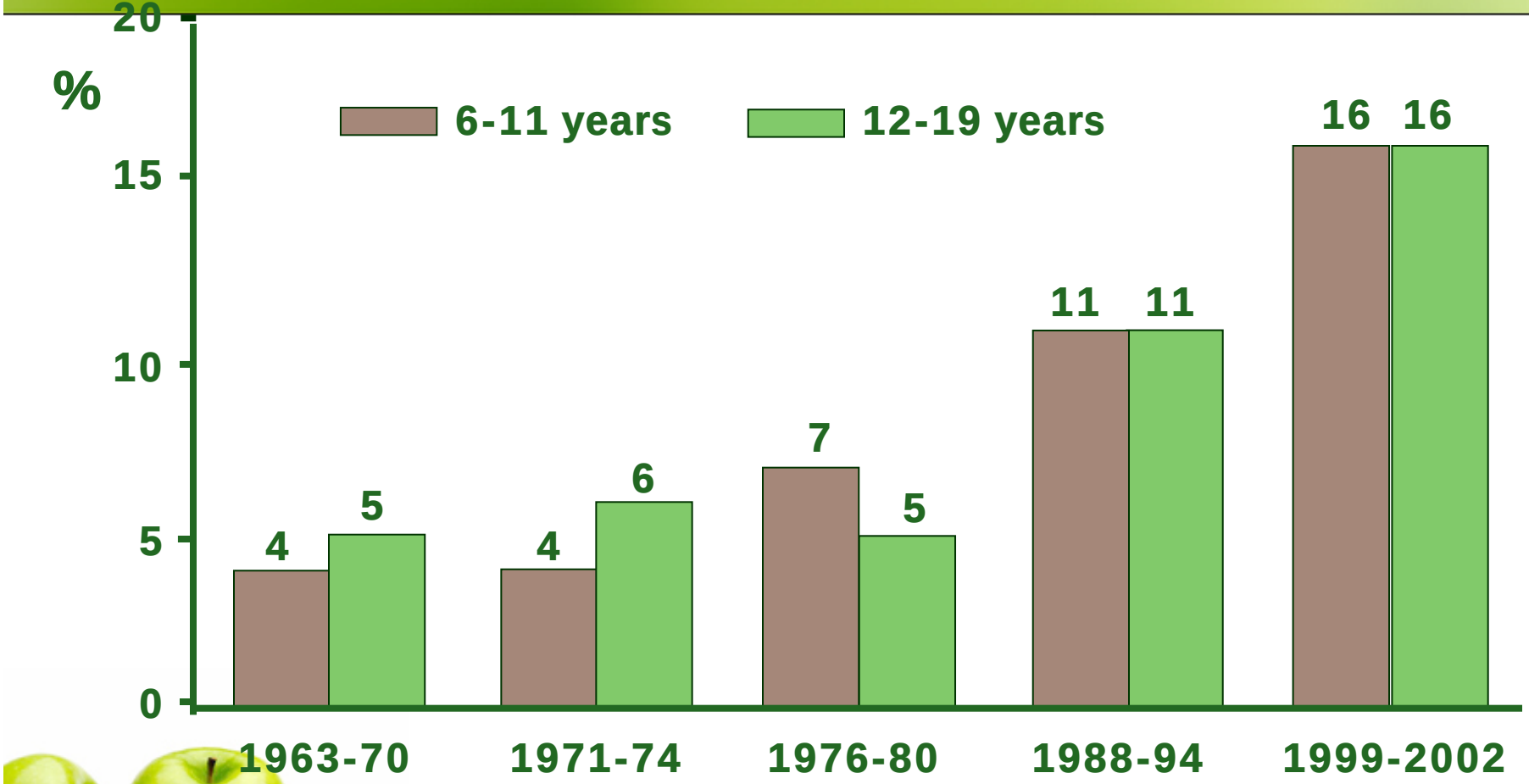

## *Prevalence of overweight children aged between 4-11 years by country, latest available year, Europe*




International Obesity Task Force (WHO 2004)

www.heartstats.org

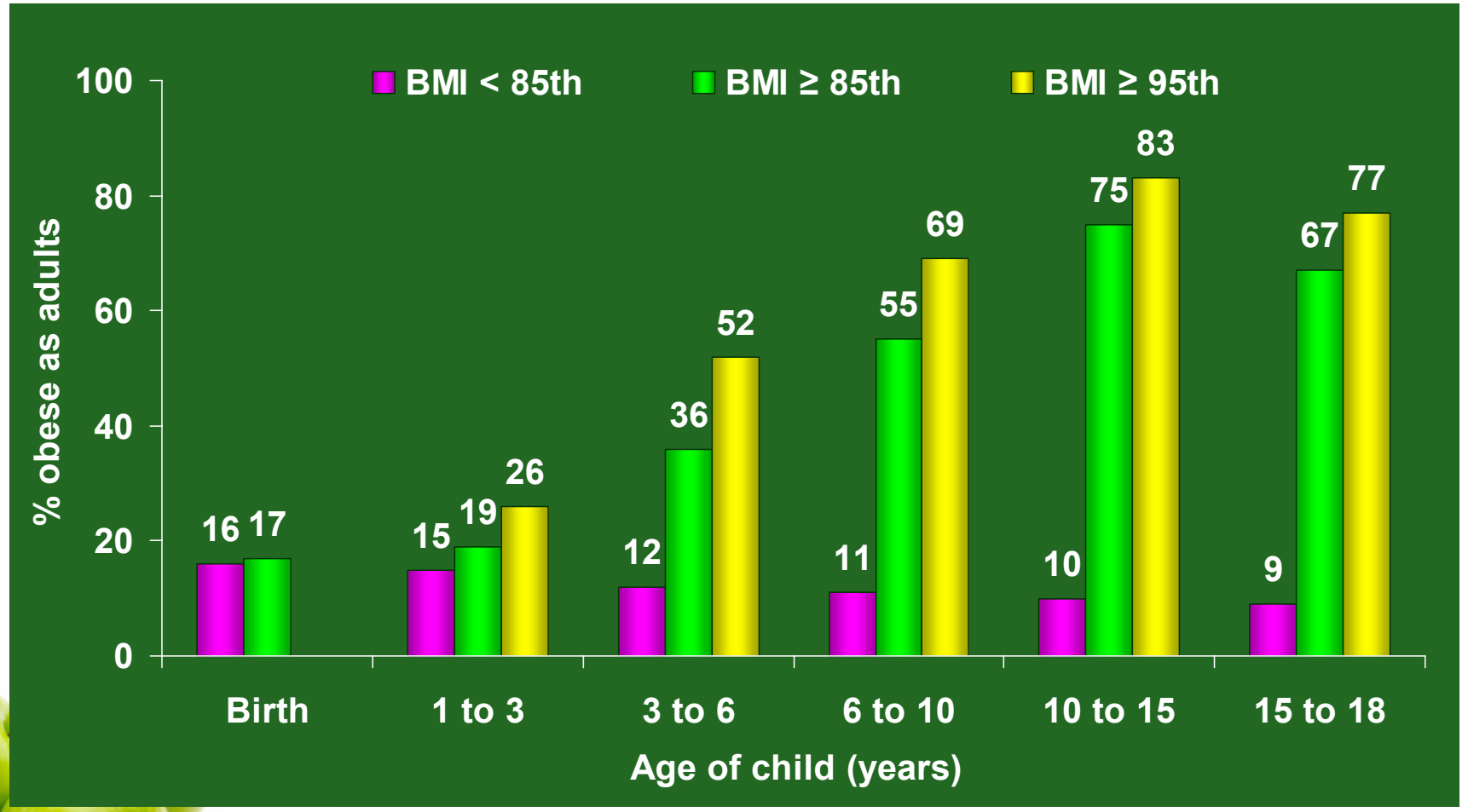
# Prevalence of overweight among US children & adolescents aged 6–19 yrs




Notes: Excludes pregnant women starting with 1971-74. Pregnancy status not available for 1963-65, 1966-70. Data for 1963-65 are for children 6-11 years of age, data for 1966-70 are for adolescents 12-17 not 12-19 years

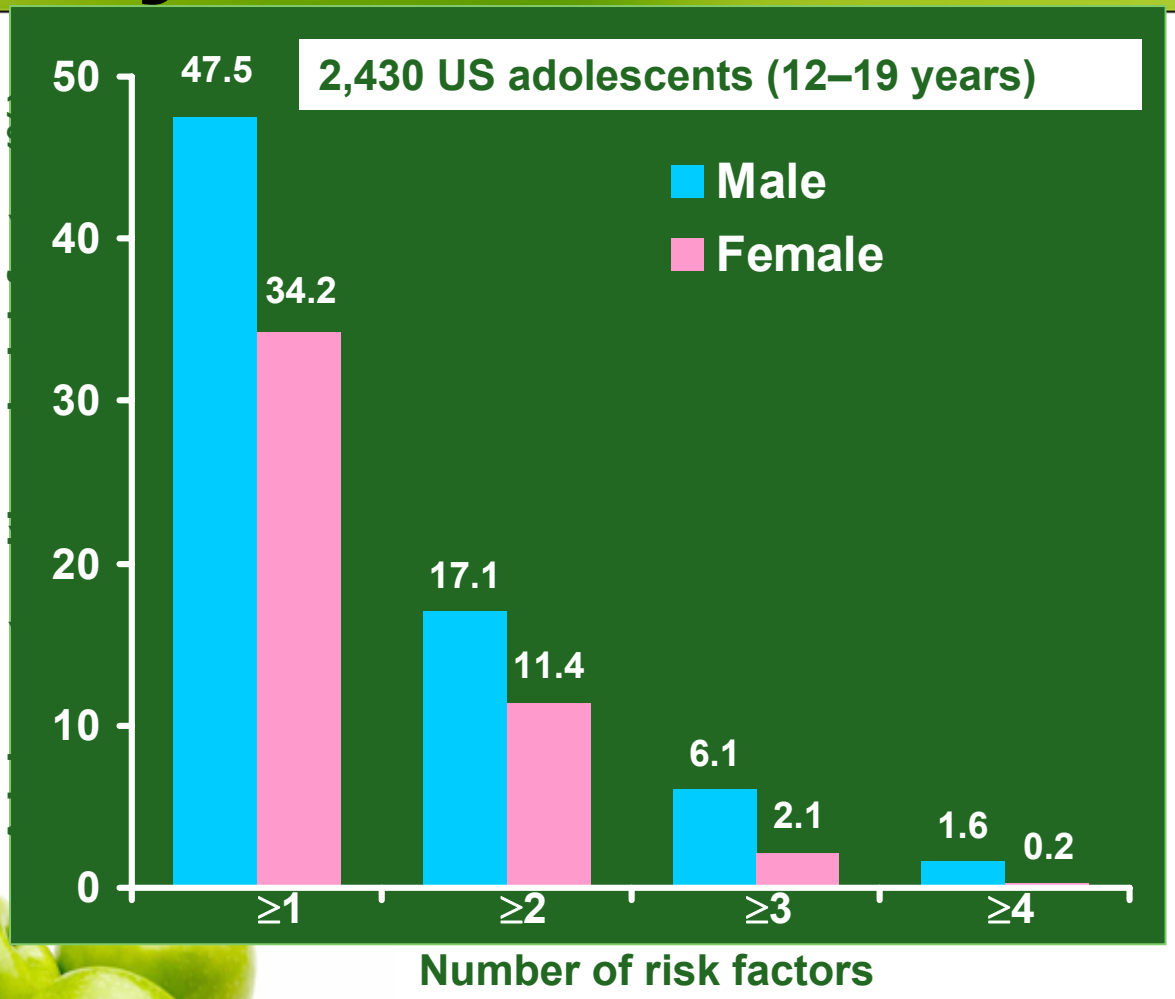
*Source: CDC/NCHS, INHES and NHANES*
*Hedley AA et al. JAMA 2004;291:2847-2850*

# Tracking BMI-for-Age from Birth to 18 Years with Percent of Overweight Children who are Obese at Age 25




Whitaker et al. *NEJM*. 1997;337:869-873

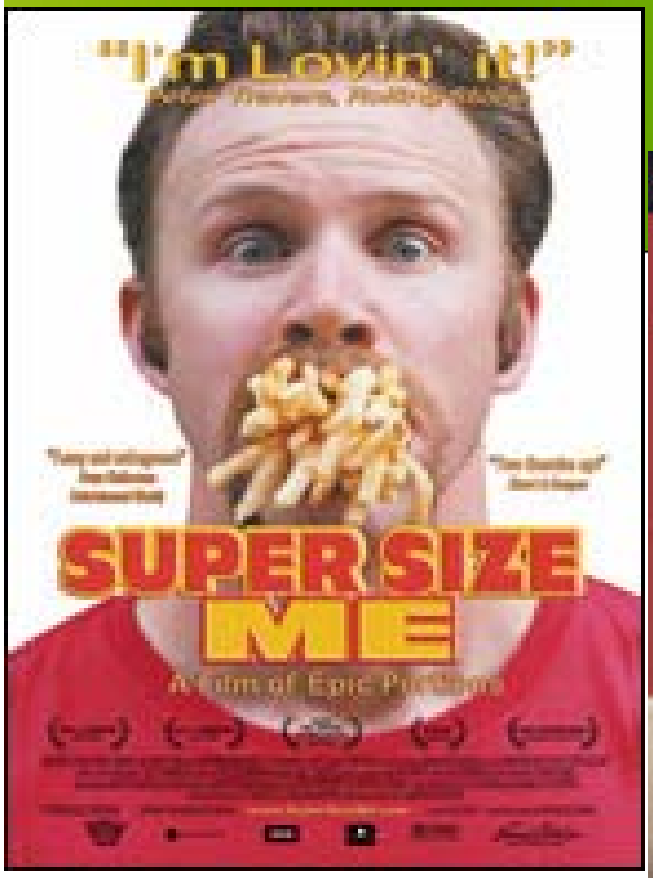
# Prevalence of Metabolic Syndrome in Adolescents



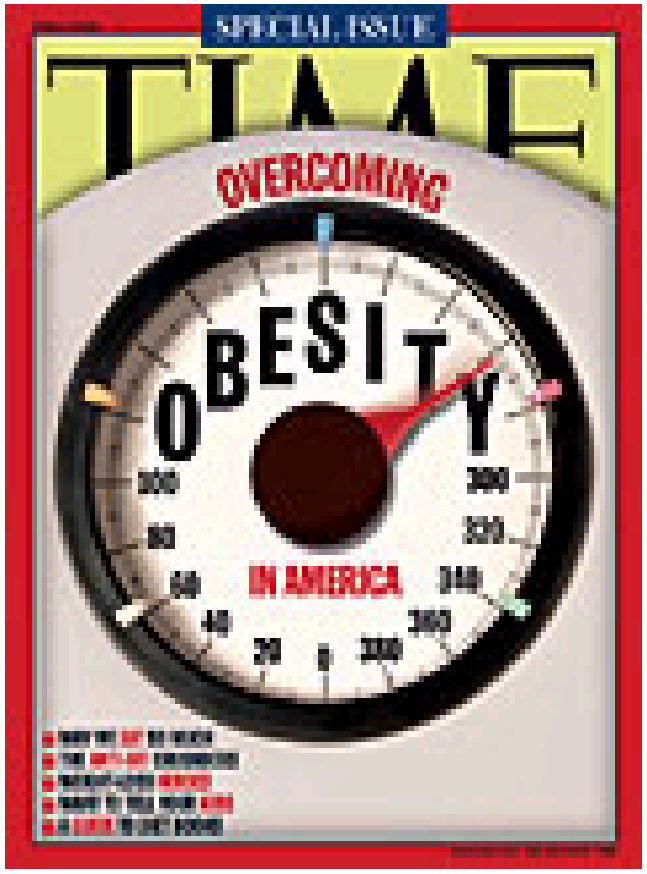

**Overall prevalence 4.2%**

**In adolescents with BMI above 95th percentile, prevalence ~29%**

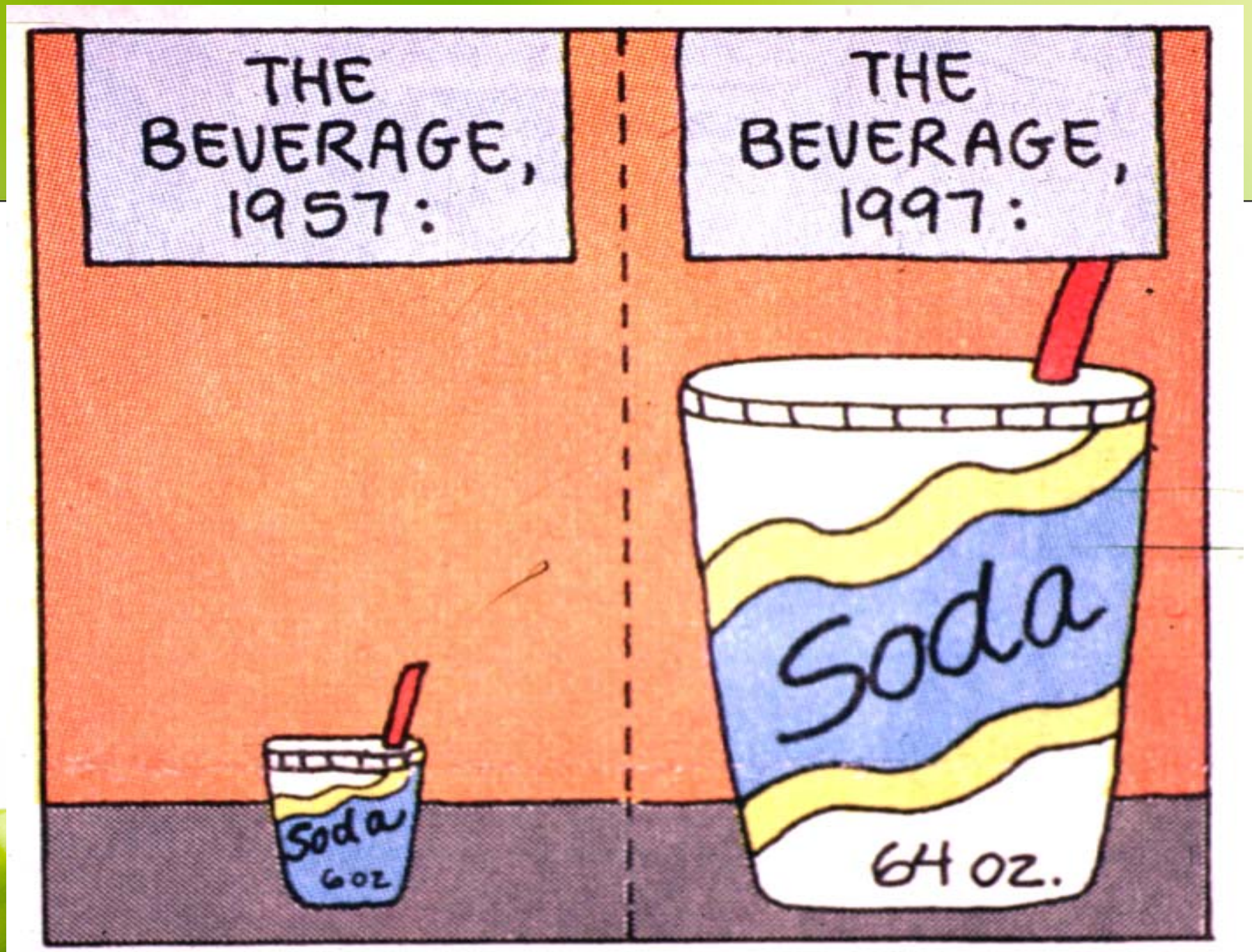
Cook et al. Arch Pediatr Adolesc Med, 2003 (NHANES III, 1988–1994)





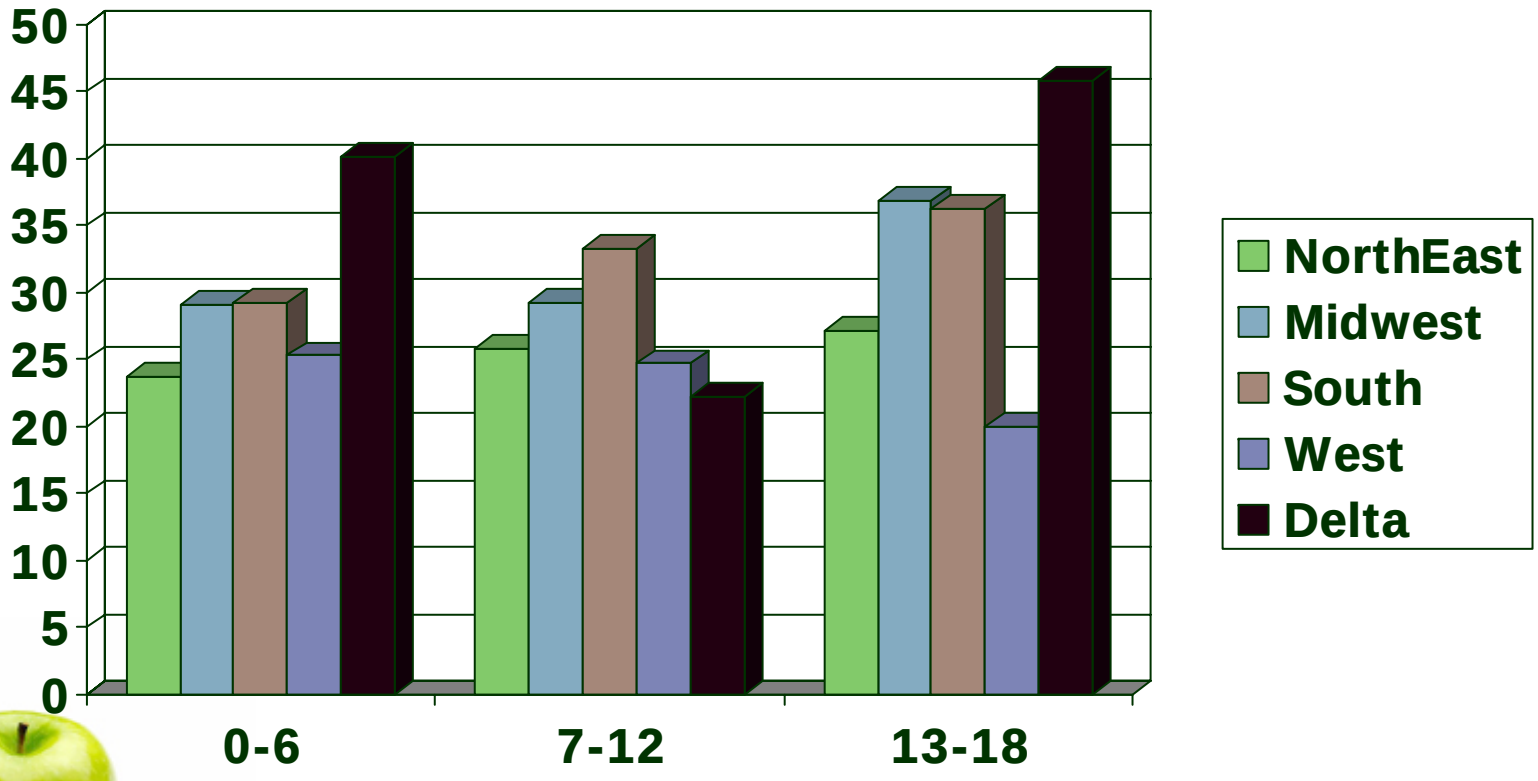



INTERNATIONAL FOOD INFORMATION COUNCIL FOUNDATION


THE BEVERAGE, 1957:
THE BEVERAGE, 1997:
Soda
6oz
Soda
64 oz.

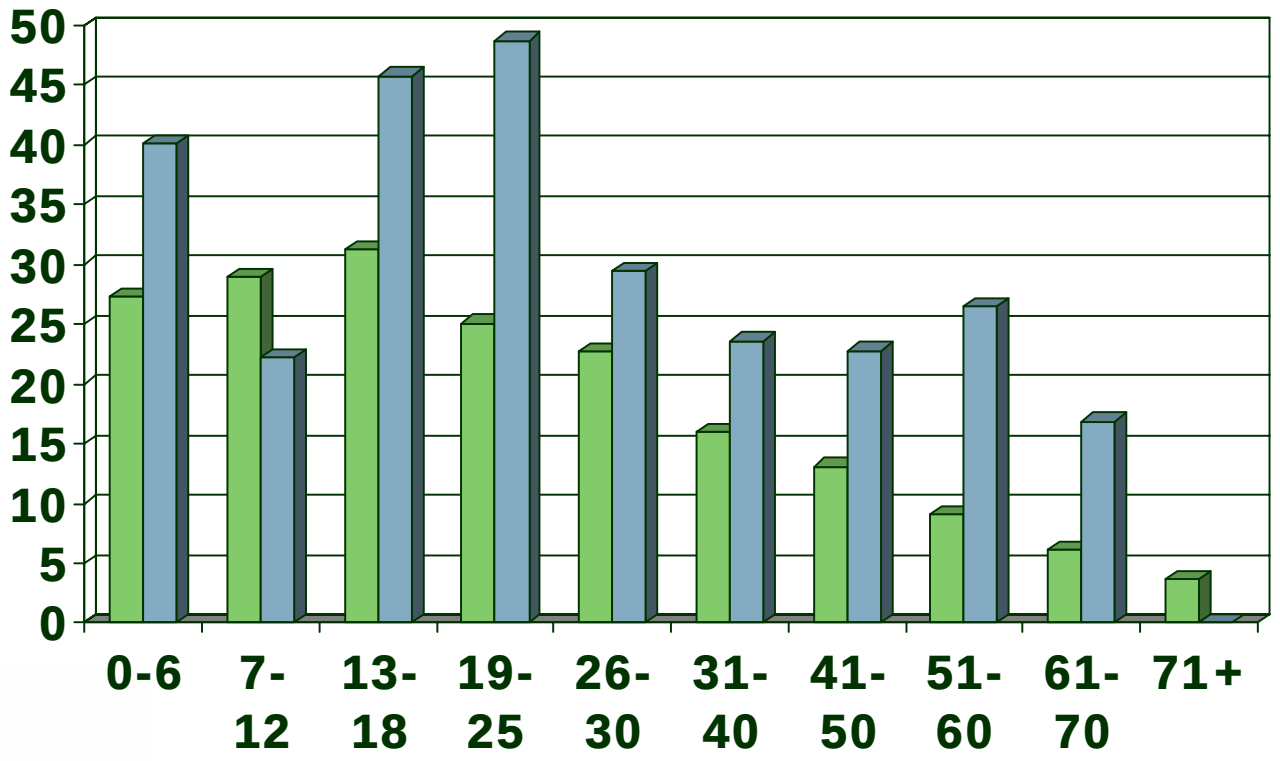
| | |
|---|---|
| Big Mac | 390 calories |
| Large Fries | 540 calories |
| Large Soda | 310 calories |
| | 1240 calories |

# Percentage of Vegetable Servings from French Fries and Potato Chips among Children by Region of the Country



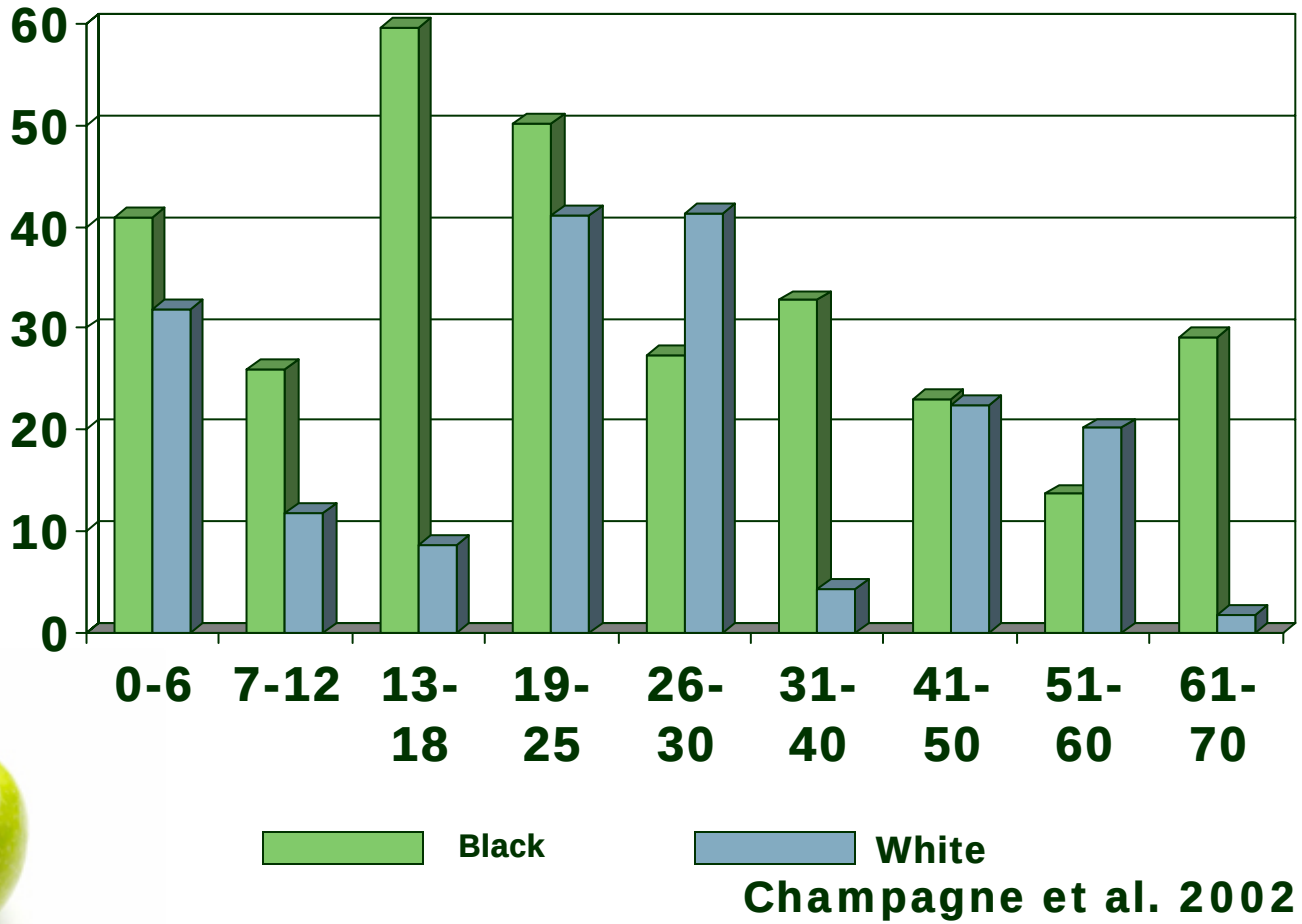

Champagne et al. 2002

# Percentage of Vegetable Servings from French Fries and Potato Chips for Age Groups into Adulthood




Champagne et al. 2002

# Percentage of Vegetable Servings from Fries & Chips for Age/Ethnic Groups in the Pilot Delta Population




Champagne et al. 2002

# Food Intake of Children: consumers & nonconsumers of fast food (CSFII 1994-96,98)

**Paeratakul et al. 2003**

| Children and adolescents (g/day) | Reported eating fast food | | |
|---|---|---|---|
| | Yes (n=3508) | No (n=4799) | $P^{\dagger}$ |
| **Grains and cereals** | | | |
| Bread, roll | 39 | 43 | .006 |
| Cereal, rice, pasta | 57 | 77 | <.001 |
| Grain mixture | 114 | 110 | .5 |
| Other grain products | 67 | 67 | .8 |
| **Fruits** | | | |
| Citrus fruits and juices | 66 | 70 | .5 |
| Other fruits and juices | 103 | 130 | <.001 |
| **Vegetables** | | | |
| Dark green/deep yellow | 9 | 12 | <.001 |
| Fried potato | 35 | 17 | <.001 |
| Other vegetables | 71 | 90 | <.001 |
| **Legumes, nuts, seeds** | 14 | 19 | .001 |
| **Milk and milk products** | | | |
| Fluid milk | 260 | 308 | <.001 |
| Cheese | 13 | 14 | .5 |
| Milk dessert | 28 | 24 | .03 |
| Other milk products | 54 | 49 | .2 |

$^{\dagger}P$ value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.

# Food Intake of Children: consumers & nonconsumers of fast food (CSFII 1994-96,98)

**Paeratakul et al. 2003**

| Children and adolescents (g/day) | Reported eating fast food | | |
|---|---|---|---|
| | Yes (n=3508) | No (n=4799) | $P^{\dagger}$ |
| **Meat and meat products** | | | |
| Beef | 17 | 17 | .9 |
| Pork | 6 | 7 | .1 |
| Chicken | 23 | 17 | <.001 |
| Fish and shellfish | 5 | 6 | .4 |
| Other meat | 24 | 26 | .006 |
| Meat mixture | 81 | 64 | .001 |
| **Egg** | 12 | 13 | .7 |
| **Fats, oils, sugars** | | | |
| Fats and oils | 7 | 8 | .1 |
| Sugars and sweets | 37 | 32 | .04 |
| **Beverages** | | | |
| Fruit drinks | 139 | 141 | .8 |
| Carbonated soft drinks | 358 | 179 | <.001 |

$^{\dagger}P$ value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.

# Energy & Nutrient Intake of Children: consumers & nonconsumers of fast food (CSFII 1994-96,98) Paeratakul et al. 2003

| Children and adolescents | Reported eating fast food | | |
|---|---|---|---|
| | Yes (n=3508) | No (n=4799) | *P*† |
| Total energy (kcal) | 1971 | 1816 | <.001 |
| Carbohydrate (% energy) | 53.9 | 54.1 | .5 |
| Protein (% energy) | 13.7 | 14.3 | <.001 |
| Fat (% energy) | 32.4 | 31.6 | <.001 |
| Saturated fat (% energy) | 11.8 | 11.5 | .003 |
| Total fat (g) | 71 | 64 | <.001 |
| Saturated fat (g) | 26 | 23 | <.001 |
| Cholesterol (mg) | 214 | 213 | .9 |
| Dietary fiber (g) | 12 | 13 | .05 |

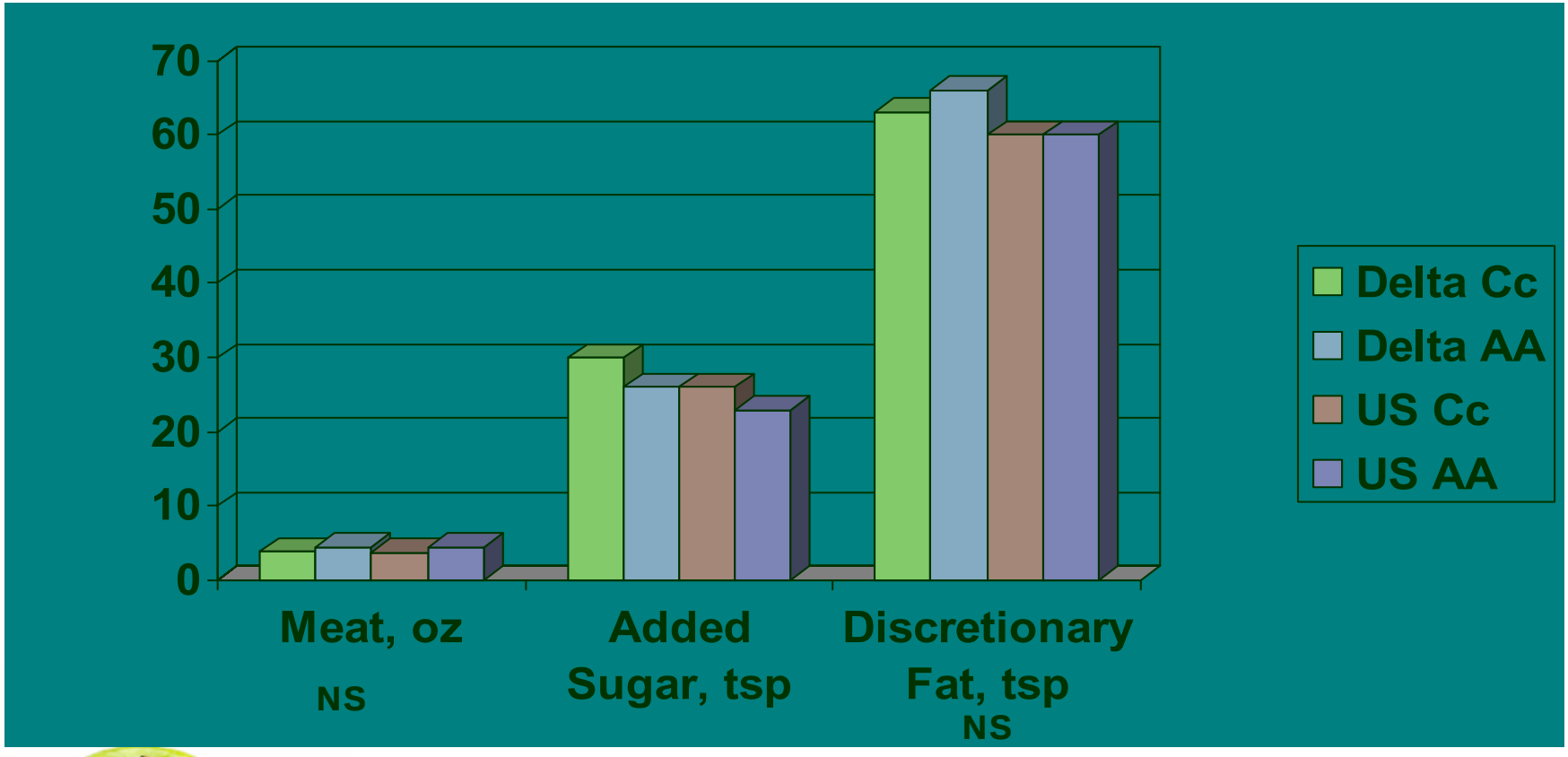
†*P* value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.

# Energy & Nutrient Intake of Children: consumers & nonconsumers of fast food (CSFII 1994-96,98) Paeratakul et al. 2003

| Children and adolescents | Reported eating fast food | | |
|---|---|---|---|
| | Yes (n=3508) | No (n=4799) | *P*[†] |
| Vitamin A (retinol equiv) | 787 | 905 | <.001 |
| Vitamin C (mg) | 92 | 100 | .02 |
| Vitamin E (mg) | 6 | 6 | .6 |
| Beta carotene (retinol eqiv) | 269 | 344 | <.001 |
| Sodium (mg) | 3001 | 2900 | .02 |
| Calcium (mg) | 875 | 868 | .7 |
| Potassium (mg) | 2244 | 2253 | .8 |
| Iron (mg) | 14 | 14 | .3 |

[†]*P* value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.

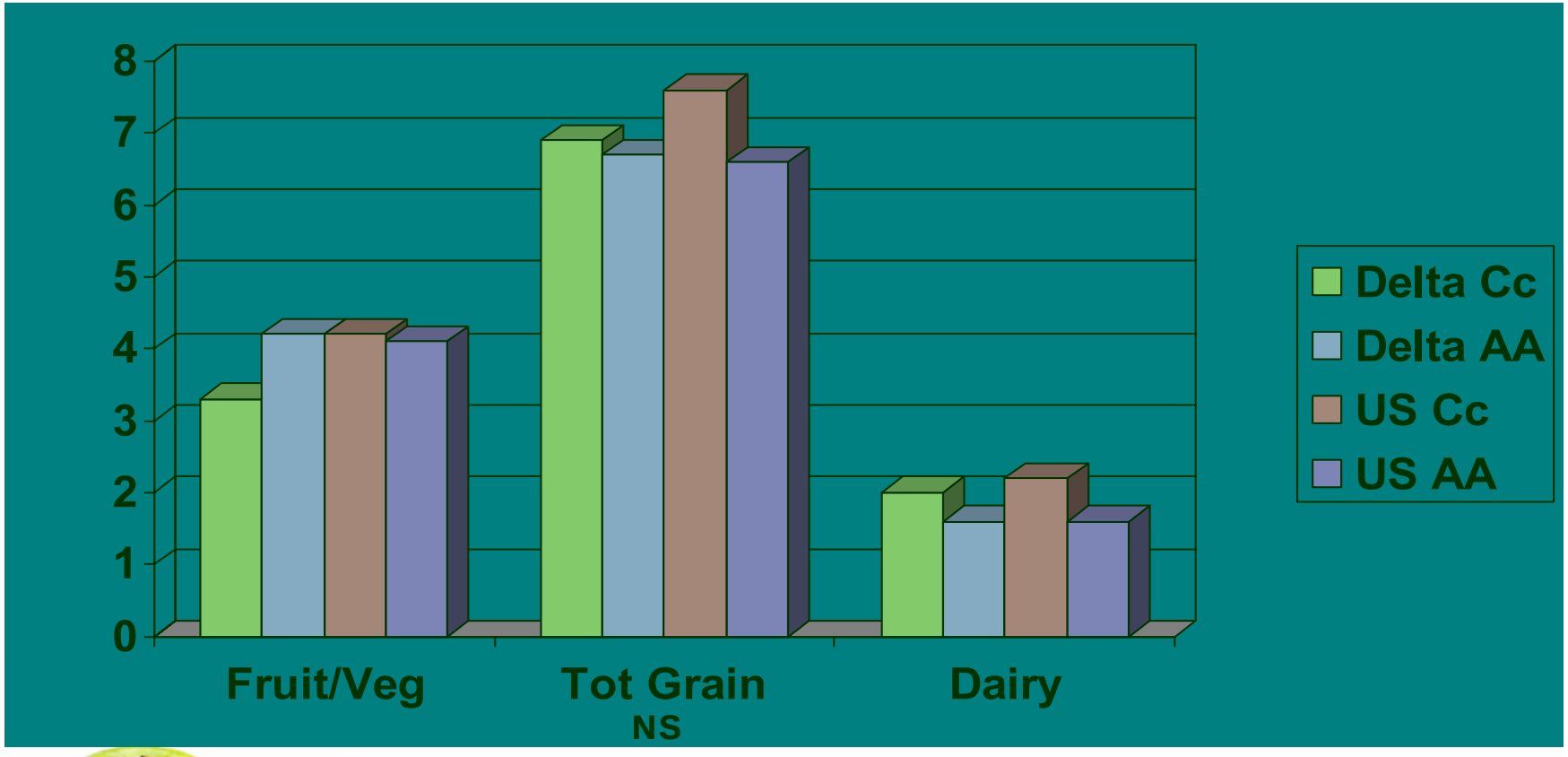
# FOODS 2000 Children: Meat & Pyramid Tip




**Added Sugar**
**P<.05 for DCc vs USCc**

**Champagne et al, 2004**

# FOODS 2000 Children: Fruit/Veg, Grains, Dairy




**Fruit/Veg**
**P<.0001 for DCc vs USCc**
**P<.005 for DCc vs DAA**

**Dairy**
**P<.05 for DCc vs USCc**
**P<.01 for DCc vs DAA**

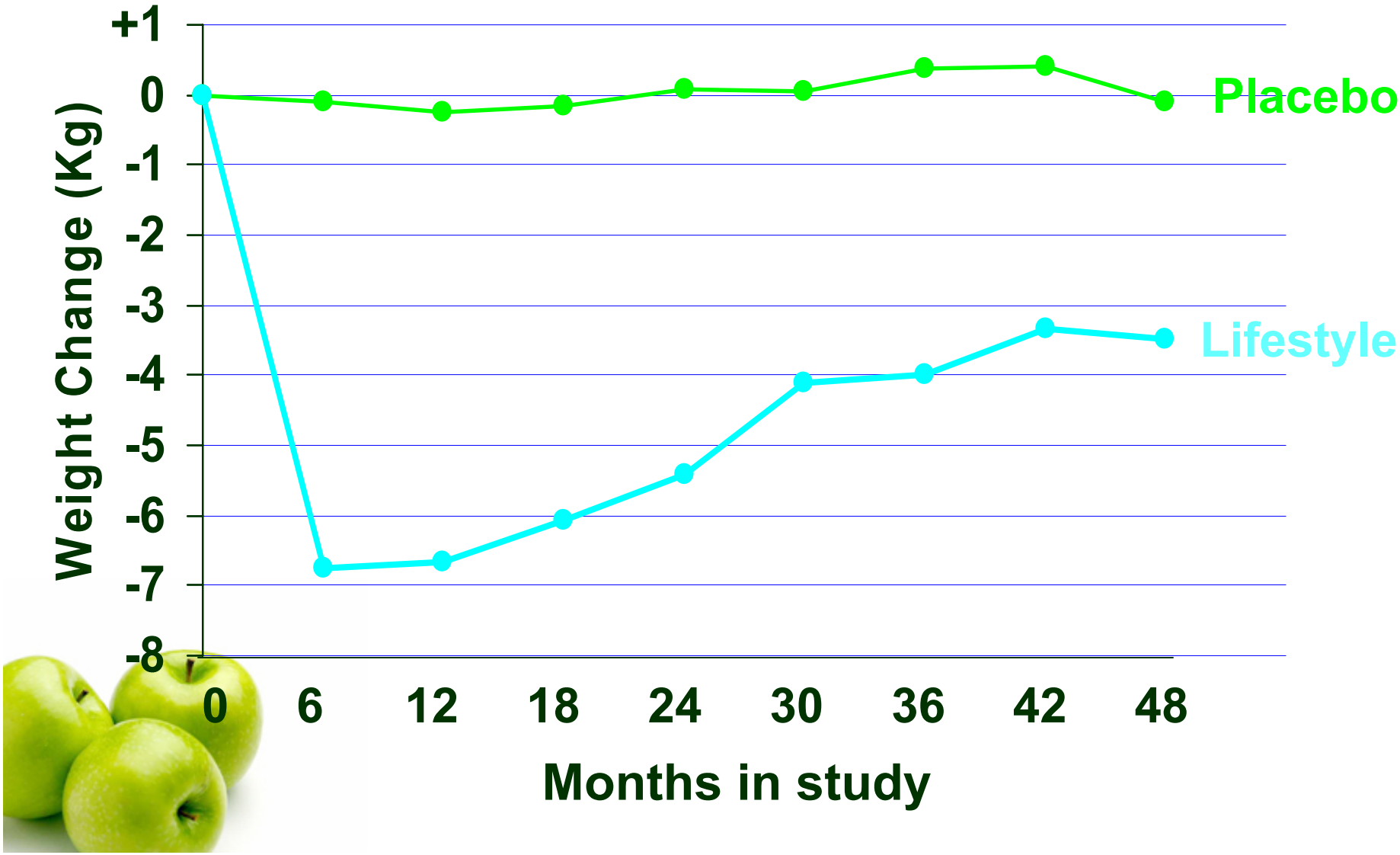
**Champagne et al, 2004**

# Current Approaches Toward Treatment of Adolescent Obesity

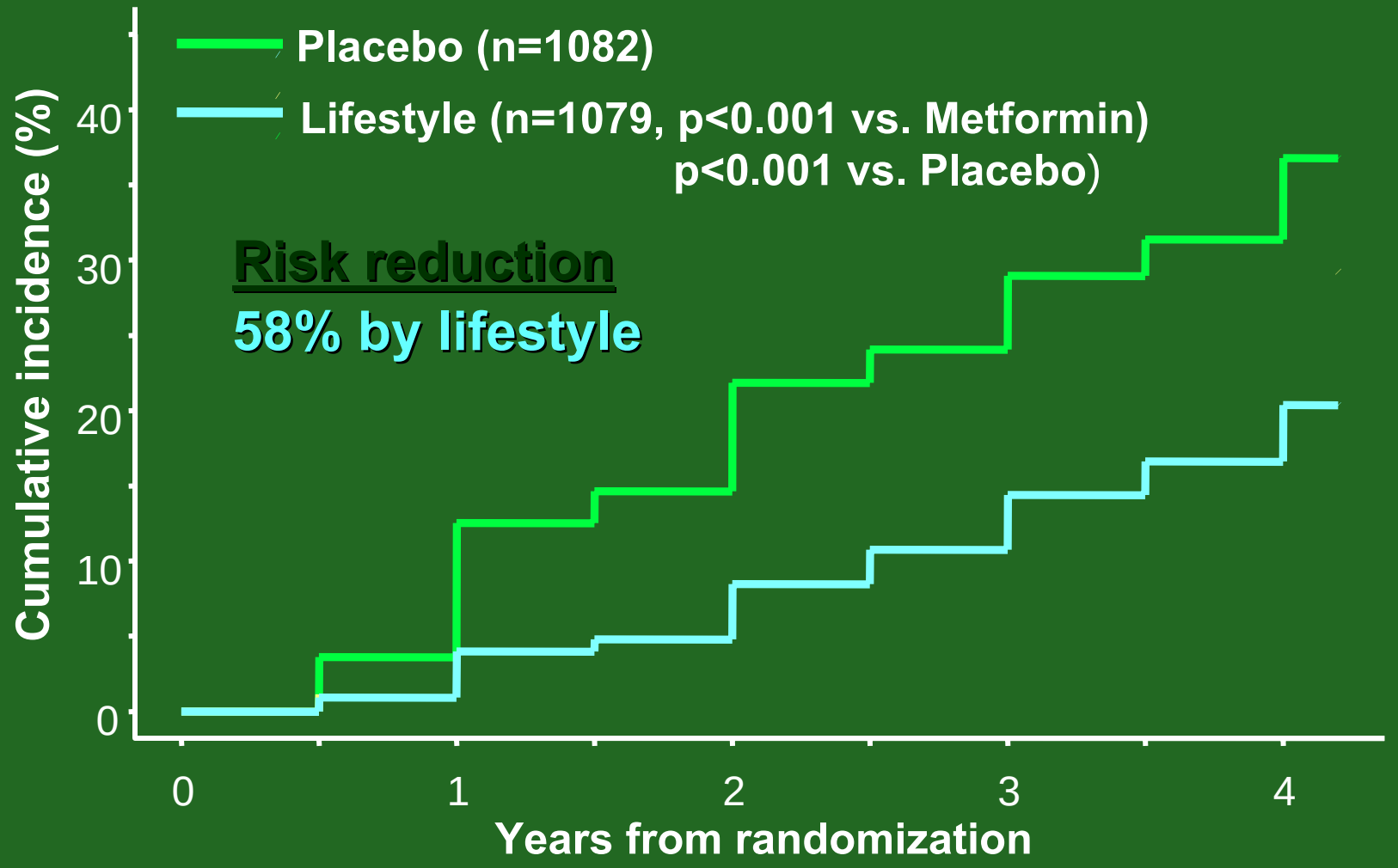
- There are controlled studies on the treatment of adolescent obesity
- Most approaches focus on diet, behavioral, and physical activity
- Family-based and school-based
- Most show small but signficant changes in weight or adiposity with substantial relapse

*Epstein LH JAMA 1990*

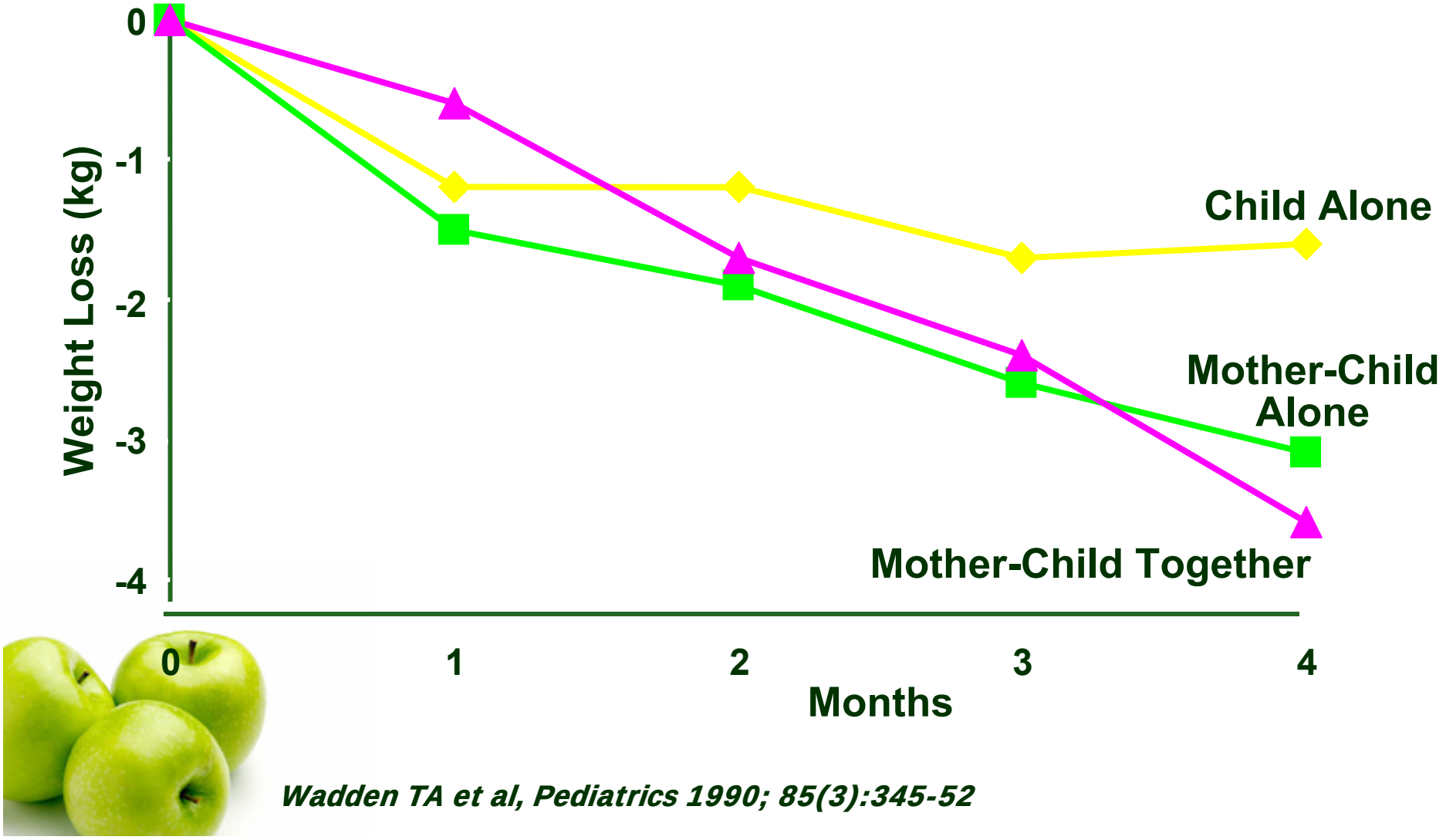
# Average Weight Change in DPP Lifestyle Group



# Incidence of Diabetes in DPP



# Effect of Treatment With Diet, Behavioral Modification and Parental Support






*Wadden TA et al, Pediatrics 1990; 85(3):345-52*

NUTRA ingredients.com | europe

Breaking News on Supplements, Nutrition & Healthy Foods

# Calls for ban on fizzy drinks in schools

30/06/2003-

**Doctors in the UK will urge the government to control the sale of fizzy drinks in schools, following similar calls in the US in recent months.**

**Medical professionals believe that sweetened, fizzy drinks, which often contain high levels of caffeine, too, are contributing to growing levels of obesity.**

**A study published last week found that such drinks are replacing consumption of milk or healthier options, which results in deficiencies of nutrients such as calcium, phosphorous and vitamin A.**

**Fizzy drinks are also being linked to obesity, tooth decay, and increasing incidences of diabetes in adulthood.**

**Doctors will debate the issue at the British Medical Association's annual conference this week, reported the *Western Mail* newspaper today.**

http://www.nutraingredients.com/news/printNewsBis.asp?id=38148

# What are Functional Foods?

***Functional foods are foods and food components that provide a health benefit beyond basic nutrition; this includes conventional foods, fortified, enriched, or enhanced foods, and dietary supplements.***

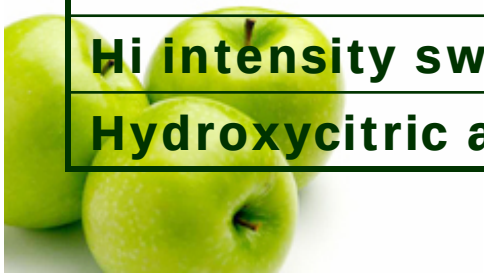
*International Food Information Council (IFIC) Foundation*

# Functional Food Alternatives?


**February 2005**
**www.preparedfoods.com**

# Percentage of Manufacturers & Consumers Who Believe These Ingredients Promote Weight Loss (Source: www.preparedfoods.com February 2005)

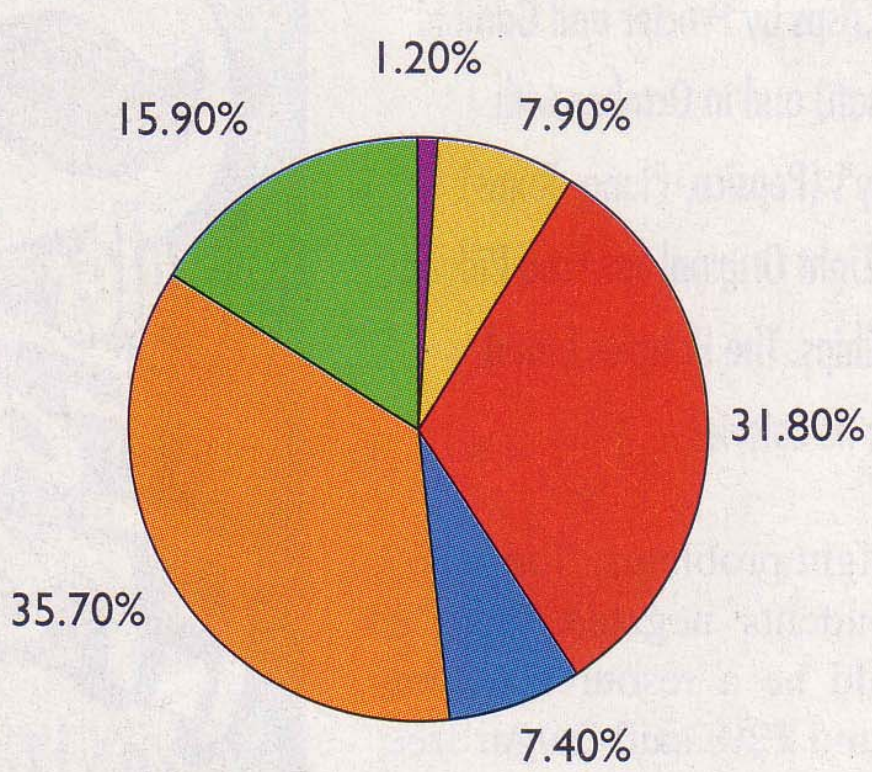
| | Manufacturers | | Consumers | |
|---|---|---|---|---|
| | 2004 | 2003 | 2004 | 2003 |
| Chitosan | 3.3 | 4.5 | 2.4 | 1.4 |
| Chromium | 11.4 | 8.7 | 12.2 | 9.6 |
| Conjugated linoleic acid (CLA) | 13.7 | 10.5 | 6.4 | 3.9 |
| DAG (1,3 diacylglycerol) | 3.3 | 4.9 | 0.7 | 1.4 |
| Dietary fiber | 76.8 | 68.9 | 76.4 | 71.0 |
| Fruit | 43.1 | 36.7 | 45.3 | 37.9 |
| Grapefruit | 18.5 | 14.0 | 32.5 | 25.7 |
| Green tea | 33.4 | 24.5 | 38.4 | 28.2 |
| Gums | 27.0 | 24.1 | 3.6 | 4.6 |
| Hi intensity sweetners (equal) | 37.9 | 35.0 | 36.6 | 28.9 |
| Hydroxycitric acid (HCA) | 3.3 | 4.2 | 1.2 | 1.8 |



# Percentage of Manufacturers & Consumers Who Believe These Ingredients Promote Weight Loss (Source: www.preparedfoods.com February 2005)

| | Manufacturers | | Consumers | |
|---|---|---|---|---|
| | 2004 | 2003 | 2004 | 2003 |
| L-carnitine | 9.0 | 9.8 | 5.3 | 5.7 |
| Med chain triglycerides (MCT) | 6.6 | 6.3 | 2.4 | 2.9 |
| Omega-3 fatty acids | 35.3 | 33.9 | 34.1 | 35.4 |
| Polydextrose | 14.7 | 11.2 | 4.3 | 3.6 |
| Protein, soy | 50.2 | 53.8 | 48.4 | 52.9 |
| Protein, whey | 31.8 | 30.4 | 24.8 | 25.4 |
| Resistant starch | 19.9 | 14.3 | 4.3 | 6.1 |
| Sugar polyols | 25.8 | 27.3 | 19.6 | 15.0 |
| Vegetables | 50.9 | 44.8 | 60.6 | 51.1 |
| Whole grains | 66.4 | 52.1 | 67.8 | 58.9 |
| Base count | 422 | 286 | 419 | 280 |

# Manufacturers' Opinions of Low-carb




- The most effective weight-loss choice available
- A healthy alternative to other weight-loss diets
- A complementary addition to other weight-loss methods
- A new trend that is just picking up speed
- A fad that will not last 6-12 more months
- An unhealthy fad

Source: The 2005 *Prepared Foods'* R&D Trends Survey: Weight Control Formulations.
Survey base: n=403; Overall survey base: n=431

# Functional Food Alternatives for Children and Teens?





# Functional Food Alternatives for Children and Teens?






# September 29, 2003
# New Biotech Potatoes Could Mean Low-Fat Fries
# By Dennis T. Avery

Biotechnology has just produced another massive breakthrough for world food security—a blight-proof potato.

In America, obesity has become a front-page issue, and it looks as though the anti-biotech campaign is about to collide with the anti-fat campaign. The low-fat biotech potatoes have 35 percent more starch, so they absorb less fat during frying. Ergo, a lower-calorie, lower-fat biotech French fry. These "leanfries" should solidify the French fry's place in the global twenty-first century, if the fry processors and drive-ins can find the courage to sell them.

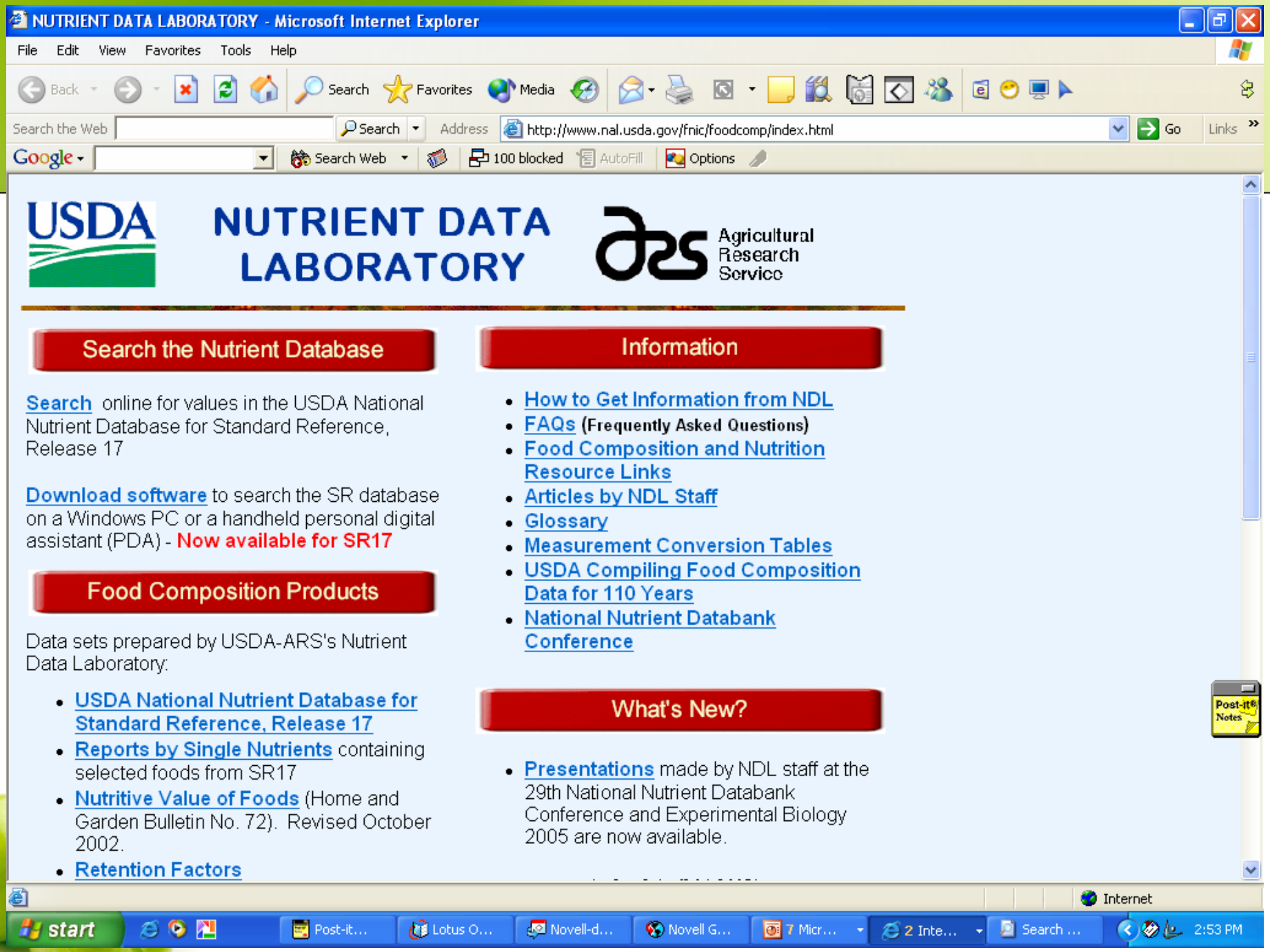
***Dennis T. Avery*** *is based in Churchville, VA, and is director of the Hudson Institute's Center for Global Food Issues.*

# Lower Fat French Fries Made From Rice

People who love french fries but need to cut their fat intake may soon be saying that the nice fry is the new fry.

This new french fry has 25 to 50 percent less fat than regular fries, says ARS food technologist Ranjit Kadan, who is with the Southern Regional Research Center in New Orleans, Louisiana.

"Basically, the main ingredient is rice - that's the good part of it," he says. "Since we are starting with rice flour, we can fortify it with protein, vitamins, and minerals to make an even more nutritious, wholesome food.


NUTRIENT DATA LABORATORY - Microsoft Internet Explorer
File Edit View Favorites Tools Help
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ars Agricultural Research Service
Search the Nutrient Database
Search online for values in the USDA National Nutrient Database for Standard Reference, Release 17
Download software to search the SR database on a Windows PC or a handheld personal digital assistant (PDA) - Now available for SR17
Food Composition Products
Data sets prepared by USDA-ARS's Nutrient Data Laboratory:
USDA National Nutrient Database for Standard Reference, Release 17
Reports by Single Nutrients containing selected foods from SR17
Nutritive Value of Foods (Home and Garden Bulletin No. 72). Revised October 2002.
Retention Factors
Information
How to Get Information from NDL
FAQs (Frequently Asked Questions)
Food Composition and Nutrition Resource Links
Articles by NDL Staff
Glossary
Measurement Conversion Tables
USDA Compiling Food Composition Data for 110 Years
National Nutrient Databank Conference
What's New?
Presentations made by NDL staff at the 29th National Nutrient Databank Conference and Experimental Biology 2005 are now available.
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Edit View Favorites Tools Help

Back Search Favorites Media

h the Web Search Address http://www.dietbites.com/dietteen.html Go

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# Diet Teen

***For teens seeking information and guidance on weight loss, weight management, and related dieting issues including Anorexia, Bulimia, Body Image, health, sexually transmitted diseases, and much more!***

## Teen Healthy Diet Articles

I Look Like Beauford the Cow & Swimsuit Season is Here!
The Diet & Acne Connection
The Sex & Diet Relationship
Teen Rebel
Click Here for Section II of Diet Teen
Smokin'- Have You Seen the Marlboro Man Lately?
My Friend is a Bit Druggy
Pullin' G's in a Mustang Coup
Friends, Romans, Lend Me Your Ears!
Set The Sail
Sky At Dawn

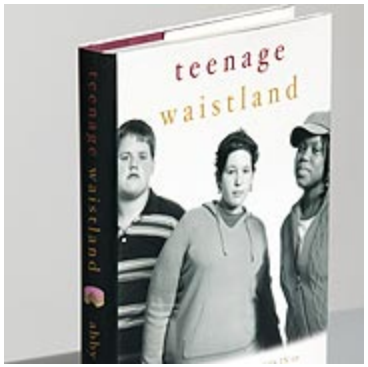
Hey guys - Greg and Marsha here. Look at the loot on our table. Peachy king, eh? Greg hand-squeezed the orange juice all by himself.

As you can see, a healthy diet doesn't have to be bland. Now when you get really old and your face looks like a roadmap, and the back of your butt touches your heels, then you'll love bland dieting. Think about it... Geezers love stuff like stewed prunes, sweet potatoes - you know, anything that gives them gas.

But enough about geezers. Look at all the great food piled on our table! It's fit for a Prom Princess or a Prom Prince. Healthy fruits, veggies, grains, breads, lean meats - it's stuff that our bodies love. And look at our teeth. White, aren't they? That's from all the milk we drink. (Okay, so we touched up the picture a bit.)
So if you're wanting to get fit, stick around Diet Teen and check out the snazzy articles, tips, suggestions and the like. And while you're here, have an apple on us!
*Greg & Marsha*

# Weight loss can't be forced on children

By Nanci Hellmich, USA TODAY
Browbeating won't work. Neither will bribes or threats. If you really want to help your overweight child slim down, set a good example, create a healthy environment at home and remember that real change has to come from within the child.




*Teenage Waistland* author Abby Ellin encourages parents to model healthy behaviors that their kids can follow.

http://www.usatoday.com/life/lifestyle/2005-06-05-obese-kids_x.htm?csp=N009

# Preventing and Addressing Obesity in Children and Adolescents

- Promote an active lifestyle
- Promote the intake of fruits and vegetables
- Restrict the intake of energy-dense, micronutrient-poor foods such as packaged snacks
- Restrict the intake of sugar-sweetened soft drinks

# Preventing and Addressing Obesity in Children and Adolescents

- Detect and respond appropriately to children at risk at an early age
- Modify the environment to:
  - enhance physical activity in schools and communities
  - address the food environment in school (e.g., vending machines)
- Create more opportunities for family interactions (e.g., family meals)

# Preventing and Addressing Obesity in Children and Adolescents

- **Limit the exposure of young children to heavy marketing of energy-dense, micronutrient-poor foods**
- **Provide the necessary information and skills to make healthy food choices**

# Conclusions

- In addressing childhood obesity, lifestyle is the most critical factor.
- Functional foods, including foods which offer improved choices over traditional foods, can help to provide children with some appealing alternatives.

# Conclusions

- **Conventional foods with functional properties, such as fruits and vegetables, can be incorporated into a dietary pattern appropriate for achieving and maintaining a healthy weight.**
- **Modifications to the both the food and activity environment will help to enhance the success of efforts to reduce childhood obesity.**